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Offshoring and Employment in Canada: Some Basic Facts

By René Morissette and Anick Johnson

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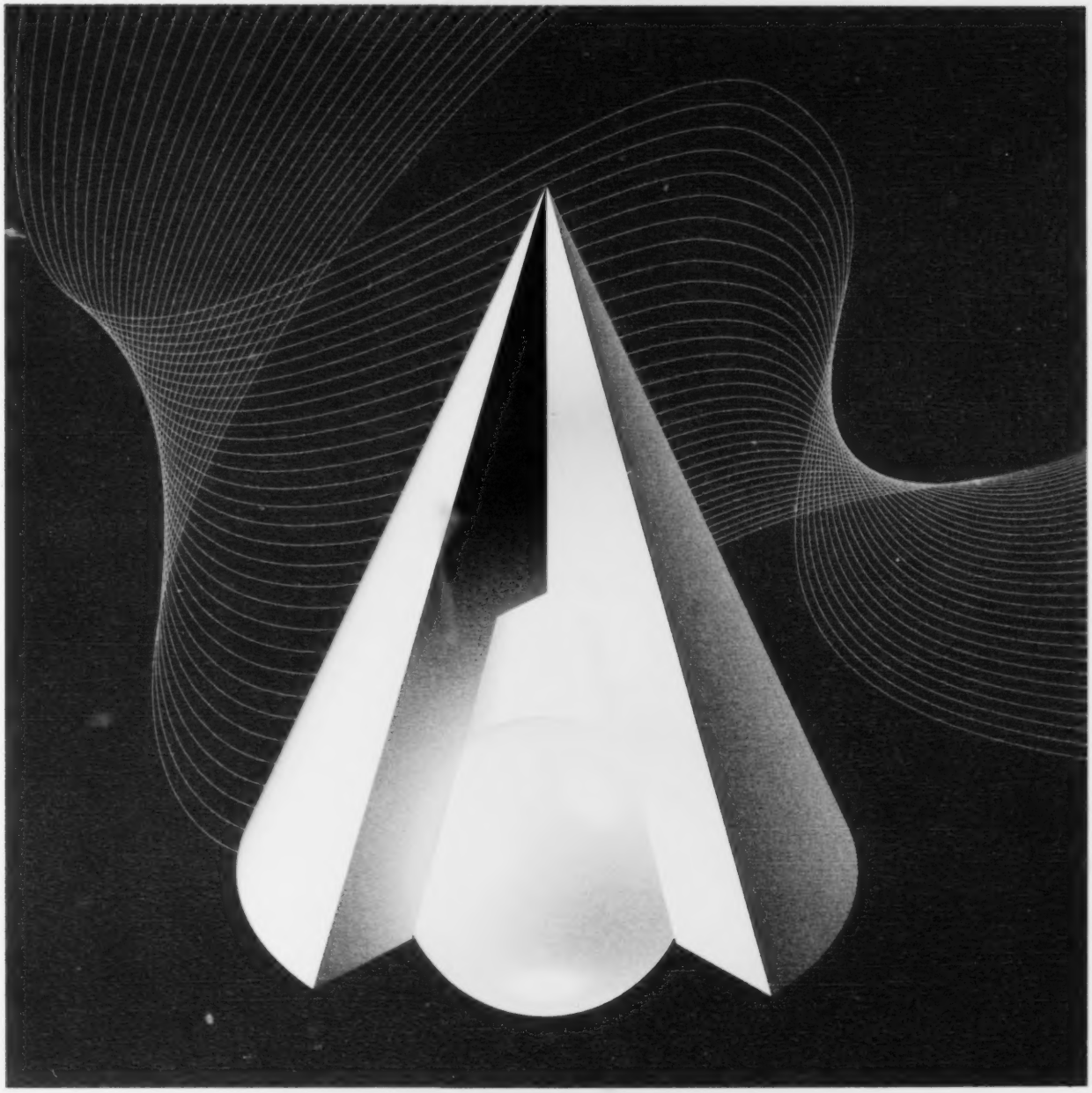

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Offshoring and Employment in Canada: Some Basic Facts

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Abstract

In this study, we assemble a wide variety of data sets in an attempt to produce a set of stylized facts regarding offshoring and the evolution of Canadian employment in recent years. Our main finding is that, in almost all of the data sets used, there is, *so far*, little evidence of a correlation between offshoring, however defined, and the evolution of employment and layoff rates. While our analyses are fairly simple, they all suggest that if foreign outsourcing has had an impact on Canadian employment and worker displacement so far, this impact is likely to be modest and thus, unlikely to be detected either with industry-level or occupation-level data.

Keywords: Offshoring; Foreign Outsourcing; Globalization; Employment; Job Loss; Layoffs

Executive summary

Using a wide variety of data sources, we present a set of stylized facts regarding offshoring and the evolution of employment in Canada in recent years. Our main findings are the following:

1) Up until 2004, Canada's imports of *computer, information and other business services* from non-OECD countries represented fairly small amounts and thus, were unlikely to be associated with substantial job losses.

2) Throughout the 1996-to-2004 period, Canada's exports of these commercial services to non-OECD countries exceeded its imports, thereby indicating that while some Canadian firms are increasingly involved in foreign outsourcing, others are also benefiting from foreign insourcing.

3) About 20% of Canadian jobs were potentially subject to service offshoring in 2006. Women are found in these jobs more often than men. The jobs most likely to be affected by service offshoring are found in high-skill services.

4) While employment in clerical occupations potentially affected by service offshoring fell by 138,000 between 1987 and 2006, most of the decline in employment either: a) occurred too early to be caused by service offshoring, or b) took place outside of the commercial sector, where service offshoring is unlikely to have been important so far.

5) There is no evidence that industries with a relatively large share of occupations subject to service offshoring in 1994 to 1995 saw their employment growth decelerate relative to other industries between the 1987-to-1995 and the 1996-to-2006 periods.

6) There is little evidence that occupations potentially affected by service offshoring have displayed smaller employment growth in industries that experienced substantial increases in imports of computer, information and other business services *from non-OECD countries* than similar occupations located in other industries. A negative and significant relationship between employment growth and growth in these imports coming from non-OECD countries is observed only for professional occupations potentially affected by service offshoring and when using a 3-digit industry classification. However, since these results are based on a fairly small number of industries, they must be interpreted with a great deal of caution.

7) The evolution of layoff rates by occupation provides, *so far*, no clear signal of a link between service offshoring and job loss.

8) After controlling for industry-specific fixed effects, manufacturing industries that experienced strong growth in offshoring (as measured by increases in the share of intermediate goods and services that they imported) during the 1983-to-1989 and the 1994-to-2000 periods did not experience employment growth rates that differed relative to those of other industries.

I. Introduction

New waves of technological changes often cause job destruction in some sectors in the short run, thereby increasing workers' anxiety about job security. Growth in international trade, whether induced by tariff reductions, exchange-rate movements or the emergence of new countries in specific markets, may have similar short-term effects. In recent years, the emergence of information and communication (ICT) technologies and the fast-growing supply of relatively skilled workers in low-wage countries have combined these two phenomena. They have allowed Canadian firms to contract out highly skilled jobs in service sectors such as engineering and informatics, thereby increasing the international trade of relatively sophisticated commercial services. The common perception is that countries such as China, India and some other non-OECD countries have provided the skilled workforce required for these jobs, which generally pay high wages in Canada.

A widespread concern, highlighted by the media during the last U.S. presidential campaign (Business Week, 2003, 2004), is that these new forms of foreign outsourcing may reduce the number of jobs available—especially those that are well-paid—in OECD countries. Put simply, the fear is that foreign outsourcing may be driving offshore jobs that are currently held in industrialized countries such as Canada.

Our first goal in this study is to assemble a wide variety of data sets in order to provide a first set of stylized facts regarding *service* offshoring and the evolution of employment in Canada in recent years. To accomplish this goal, we ask several questions.

First, what is the magnitude of Canada's imports of the commercial services most likely to be affected by service offshoring, i.e., what is the magnitude of Canada's imports of computer, information and other business services? What share of these imports is accounted for by China, India and other non-OECD countries? To what extent have imports from these countries grown since the mid-1990s?

Second, to what extent does Canada benefit from foreign *insourcing* of services, i.e., what is the magnitude of Canada's exports of computer, information and other business services? To what extent have these exports grown since the mid-1990s?

Third, what percentage of today's jobs can potentially be affected by service offshoring? How does this fraction vary across age, gender, education levels, wages and industries? How did this fraction evolve over the past few years?

Fourth, did occupations potentially affected by service offshoring display smaller employment growth rates and/or worse trends in layoff rates than other occupations in the recent past? Alternatively, did industries with a relatively large share of jobs potentially affected by service offshoring exhibit smaller employment growth rates than other industries in the last few years?

Fifth, among occupations potentially affected by service offshoring, did those located in industries that experienced relatively strong growth in imports of computer, information and other business services *from non-OECD countries* experience smaller employment growth than those located in other industries?

While recent discussions about foreign outsourcing have focused on *service* offshoring—defined as the offshore trade in arm's-length services (e.g., Bhagwati, Panagariya and Srinivasan, 2004)—previous empirical work focusing on the manufacturing sector (Feenstra and Hanson, 1996, 1999) has used a broader definition of foreign outsourcing: the share of intermediate goods and services (including manufactured components) that firms import from abroad. Our second goal in this paper is to focus on manufacturing industries and to examine whether cross-industry variation in growth in this broader measure of outsourcing is correlated with cross-industry variation in employment growth rates.

The paper is organized as follows. After providing a brief overview of recent studies on offshoring (Section II) and reviewing the data and concepts used in this study (Section III), we document the evolution of *service* offshoring between 1996 and 2004 (Section IV). To do so, we examine how imports of computer, information and other business services have evolved during that period. We then sketch a profile of jobs potentially affected by service offshoring (Section V) and examine the association between service offshoring and employment (Section VI). In section VII, we focus our attention on the manufacturing sector and examine the association between (changes in) the share of intermediate goods and services imported by manufacturing industries and (changes in) employment. A conclusion follows.[1]

Our main finding is that, in almost all of the data sets used, there is, *so far*, little evidence of a correlation between offshoring, however defined, and the evolution of employment and layoff rates. While our analyses are fairly simple, they all suggest that if foreign outsourcing has had an impact on Canadian employment and worker displacement so far, this impact is likely to be modest and thus, unlikely to be detected either with industry-level or occupation-level data.

II. Offshoring and employment: A brief survey

While there is a fast-growing literature on offshoring (Feenstra and Hanson, 1996, 1999; Jensen and Kletzer, 2005; Amiti and Wei, 2004; Arora and Gambardella, 2004; Bhagwati, Panagariya and Srinivasan, 2004; Brainard and Litan, 2004; Mann, 2003; Hijzen et al., 2004; Yan, 2005; Kirkegaard, 2003; Samuelson, 2004; Schultze, 2004; Bartel, Görg and Hine, 2005; and Van Welsum and Reif, 2005), relatively few studies have examined the association between offshoring and employment.

Several empirical studies have examined the association between offshoring and wages in manufacturing. Using the share of intermediate inputs that are imported as a measure of offshoring, these studies find that foreign outsourcing increased the relative wages of non-production workers in manufacturing over the past few decades (Feenstra and Hanson, 1996, 1999; Hijzen, Görg and Hine, 2004; and Yan, 2005).

The most widely cited study about the impact of *service* offshoring on employment is the 2002 report from Forrester Research, Inc., authored by McCarthy (2002, 2004), according to which the total number of U.S. jobs outsourced will amount to 3.4 million by 2015. This amounts to an average annual outflow, of about 300,000 jobs, i.e., roughly 0.5% of all the jobs held in the nine

1. Throughout the paper, we use the terms offshoring and foreign outsourcing interchangeably.

occupational groups potentially affected by offshoring, as identified by the Forrester report.[2] Kirkegaard (2003) finds that the vast majority of the U.S. jobs lost in these nine occupational groups from 2000 to 2002 were lost in the manufacturing sector and in high-paying management positions, an occupational category different from those most frequently cited in the projections. Mann (2003) shows that some of the occupations potentially affected by service offshoring—e.g., architecture and engineering occupations, computer and mathematical occupations—have not displayed unfavourable employment growth between the late 1990s and 2003 in the United States. Jensen and Kletzer (2005) find little evidence that U.S. tradable services display lower employment growth than other services.[3] Van Welsum and Reif (2005) perform descriptive regressions on a panel of selected OECD countries between 1996 and 2003: they find no evidence of a negative correlation between imports of computer, information and other business services, on the one hand, and the share of employment potentially affected by offshoring, on the other. Likewise, Amiti and Wei (2004) use data from the United Kingdom and find that, over the 1995-to-2001 period, service outsourcing is not negatively related to employment growth at the industry level.

In Canada, Morissette and Johnson (2005) examine changes in the wage distribution in search for indirect evidence that service offshoring might have led to the elimination of well-paid jobs. They find little evidence that the share of well-paid jobs, however defined, has fallen between 1997 and 2004.

In sum, the evidence available to date suggests that *service* offshoring has had little impact on: a) employment in the United States or elsewhere, and b) on the wage distribution in Canada.

III. Data and concepts

We use two definitions of offshoring in this study. The first, referred to as *service offshoring*, is based on the imports of computer, information and other business services that occur between non-affiliated parties as well as between affiliated parties in a given year. The second definition of offshoring is restricted to the manufacturing sector and measures the share of intermediate goods and services that an industry imports in a given year. As will be shown below, the choice of these two concepts of offshoring is, to a large extent, dictated by the nature of the data sets that are currently available to measure this phenomenon.

The ideal data set for analyzing the impact of offshoring on employment would consist of firm-level longitudinal data that would contain, apart from information on offshoring and employment: a) details about a large set of potential confounders (e.g., innovation, research and development, adoption of new technologies), and b) other covariates that could potentially be

2. These nine occupational groups are: 1) management occupations, 2) business and financial operations occupations, 3) computer and mathematical occupations, 4) architecture and engineering occupations, 5) life, physical, and social science occupations, 6) legal occupations, 7) arts, design, entertainment, sports and media occupations, 8) sales and related occupations, and 9) office and administrative support occupations.
3. However, they provide suggestive evidence of smaller employment growth at the bottom of the skill distribution.

used as instruments to take into account the potential endogeneity of offshoring with respect to employment.[4] Unfortunately, such a data set does not exist currently.

Two sources of data are currently available for measuring offshoring. The first data set originates from the Balance of Payments Division in Statistics Canada and consists of a series of business surveys that measure the imports and exports of commercial services. This microdata set contains information about 48 types of commercial services (e.g., telecommunications, accounting, architectural and engineering services, information services) that are detailed in Appendix 1. Statistics can be produced for transactions between affiliated parties as well as for those between non-affiliated parties, i.e., offshore trade in arm's-length services. They can also be broken down by industry and by country of origin or destination, thereby allowing us to distinguish imports from OECD countries from those originating from low-wage countries such as China and India. While the microdata are currenly available for the 1993-to-2004 period, some changes to the data collection procedures were implemented in 1995 and 1996.[5] To maintain consistency over time, we will therefore present statistics on imports and exports of commercial services for the 1996-to-2004 period.

When using this data set, we classify imports of commercial services into three groups: a) computer and information services, b) other business services, and c) other commercial services.[6] As mentioned above, we then define *service offshoring* as imports of computer, information and other business services that occur between non-affiliated parties as well as between affiliated parties.

Our motivation for including transactions between affiliated parties is the following. When Canadian firms contract out certain services abroad, some groups of Canadian workers may face a risk of job loss while others may experience a growing demand for their services (if contracting out abroad leads to a decrease in firms' costs and a corresponding increase in their level of output), *whether these services are contracted out to affiliated parties or not*. For this reason, we consider imports of the services defined above both from affiliated parties and from non-affiliated parties.

The second source of data consists of statistics from Input-Output tables regarding the share of intermediate goods and services that each 3-digit industry purchases outside the country. While these statistics are available for a fairly long time period—the 1970-to-2003 period—they do not allow researchers to separate imports from OECD countries from those originating from non-OECD countries, where wages are lower. Furthermore, the level of detail available to analyze

4. While an exogenous increase in offshoring may alter firms' demand for various types of workers, the causality may also run the other way. Specifically, changes in the level of output may induce both changes in employment and changes in the mix of inputs used, which, in turn, may potentially lead to changes in the magnitude of offshoring.
5. Some of the changes implemented are the following. Starting in 1996, an estimate of the value of the physical copies of prepackaged software exports is deducted from software exports. Second, data on information services were requested from respondents for the first time in 1995. Third, data on management services include specific survey results for legal firms beginning in 1995.
6. Other business services include: 1) non-financial commissions, 2) equipment rentals, 3) management services, 4) advertising and related services, 5) research and development, 6) architectural, engineering and other technical services, 7) miscellaneous services to business, and 8) audio-visual services. Other commercial services include: 1) communication services, 2) construction services, 3) insurance services, 4) other financial services, 5) royalties and license fees, and 6) personal, cultural and recreational services.

trends in the service sector is fairly limited since the data in this sector are disaggregated using only 34 industries. In contrast, the manufacturing sector is disaggregated into 76 industries. Hence, our second definition of offshoring will focus on manufacturing industries and will measure the share of intermediate goods that are imported by each of these industries in a given year.

Not surprisingly, a wider variety of data sets are available to measure employment. The Labour Force Survey (LFS) covers the 1976-to-2006 period and can be used to analyze net changes in employment. These can be examined on a consistent basis at the industry level over the 1976-to-2006 period or at the occupation level over the 1987-to-2006 period. The Survey of Employment, Payroll and Hours (SEPH) allows an analysis of employment trends starting in 1983. Since year-to-year net changes in employment hide substantial job creation and destruction, data on layoffs are also required. The Survey of Labour and Income Dynamics (SLID) can be used to analyze layoff rates in various occupations between 1993 and 2004 while Statistics Canada's Longitudinal Worker File (LWF) can be used to document trends in *permanent* layoff rates by industry over the 1991-to-2002 period.[7]

IV. Imports and exports of computer, information and other business services, 1996-2004

In 2004, Canadian imports of commercial services amounted to roughly $38.9 billion while exports of such services totaled $34.5 billion (Table 1). In contrast, Canada's imports and exports of goods amounted to $364 billion and $429 billion respectively.[8] Assuming that manufacturing value added is about one third of manufacturing output (Trefler, 2005), this suggests that our offshore trade in commercial services represented between 24% and 32% of the value added associated with our international trade in goods during that year.[9] Thus, offshore trade in commercial services represents a non negligible volume of economic activity.[10]

In order to assess the magnitude of Canada's imports of those commercial services *most likely to be affected* by *service offshoring*, we examine the value of Canada's imports of computer, information and other business services. In 2004, imports of computer and information services amounted to $2.4 billion while imports of other business services were equal to $15.7 billion (Table 1). Thus, imports of computer, information and other business services amounted to roughly $18 billion. Exports of these services totalled roughly $20 billion.
While imports of computer and information services still represent fairly small amounts, they grew rapidly over the 1996-to-2004 period, more than tripling over this time interval. However, exports of these services grew even faster: they increased by a factor of four over that period.

7. In this study, permanent layoffs occur when workers separate from their employer in year t and do not return to that employer in year t or in year t+1. Since the Survey of Labour and Income Dynamics (SLID) has no firm identifier, it cannot be used to construct a series of permanent layoff rates. While SLID can also be used to produce layoff rates by industry, its sample size is much smaller than the Longitudinal Worker File (LWF). Conversely, LWF has information on workers' industry of employment but not on their occupation. For these reasons, we analyze industry-level *permanent* layoff rates using LWF and occupation-level layoff rates using SLID.
8. CANSIM Table No. 228-0043.
9. This can be seen by using the following ratios: a) 38.9 / (364/3) or b) 34.5 / (429/3).
10. If one focuses on trade between non-affiliated parties, the corresponding numbers vary between 13% and 14%.

Throughout the 1996-to-2004 period, exports of these services exceeded imports. This pattern was observed both for transactions between affiliated parties as well as arm's length transactions.

In contrast, imports of other business services grew at an annual compound rate of 4.6%, slightly less than the rate of 6.1% observed for exports of these services. The result was that exports of these services overall exceeded imports by 2004.[11]

Not surprisingly, most of Canada's imports of computer and information services come from its biggest trade partner: the United States. Throughout the 1996-to-2004 period, firms operating in the United States supplied at least 85% of the computer and information services imported (Table 2). According to the data, non-OECD countries, including China and India, accounted no more than 2% of these imports.

In contrast, Canada's exports of computer and information services are slightly more diversified, with roughly three quarters of these sent to the United States, 14% to 23% sent to OECD countries and the remainder sold to non-OECD countries.

Hence, Canada had a trade surplus in computer and information services throughout the 1996-to-2004 period. Offshore trade in these services between Canada, on the one hand, and China, India and other non-OECD countries, on the other hand, was until 2004, fairly small. Interestingly, offshore trade in these services with China and India generated a small deficit in 2004 ($20 million of imports versus $8 million of exports).

Like imports of computer and information services, imports of *other business services* are highly concentrated geographically (Table 3). The United States accounted for 79% to 85% of these imports during the 1996-to-2004 period, compared to about 5% for the United Kingdom and 7% to 13% for Japan and other OECD countries. While other non-OECD countries played a non negligible role (3% to 6%), China and India had a marginal involvement regarding these imports.

Likewise, fully 61% of Canada's exports of *other business services* were sent to the United States in 2004. The remainder went to the United Kingdom (3%), China (2%), Japan (1%), other OECD countries (15%) and to other countries (18%).

Most important, imports of computer, information and other business services from non-OECD countries (i.e., China, India and other countries) represented roughly $1 billion in 2004. Exports of these services to non-OECD countries were, in the aggregate, greater as they amounted to roughly $3.5 billion that year. The corresponding numbers for China and India, taken together, are $119 million and $346 million, respectively.

As expected, service-producing firms do most of Canada's imports of computer and information services (Table 4).[12] Among these, firms operating in information, culture and arts and those operating in professional, scientific and technical services are the two major players. The ICT

11. Arm's length exports of these services exceeded arm's length imports in 2004 while the reverse was true regarding trade in these services involving affiliated parties.
12. Since consistent industrial codes are available starting only in 1999, the numbers shown in Tables 4 and 5 are presented only for the 1999-to-2004 period.

sector, which includes some industries belonging to these two industrial groups, accounted for slightly more than half (53%) of these imports and about 85% of the corresponding exports in 2004.

While imports of computer and information services are concentrated among two industrial groups, imports of other business services are slightly more diversified across industries. For instance, while manufacturing firms imported almost 40% of these services in 2004, those operating in information, culture and arts and those operating in professional, scientific and technical services accounted for 18% and 15%, respectively, of the imports of these services (Table 5). Exports of such services are also fairly diversified across industries.

In sum, two main messages emerge from the analysis of offshore trade in computer, information and other business services. First, except for 1996, exports of these services have overall exceeded imports up until the 2004 period (Table 1). Thus, while being increasingly involved in foreign outsourcing, Canada has also benefited from foreign *insourcing*.

Second, Canada's exports of these commercial services *to non-OECD countries* also exceeded its imports throughout the 1996-to-2004 period. Imports of these services from non-OECD countries represented roughly $1 billion in 2004, the year for which the most recent data are available. As a result, they are unlikely to have caused substantial job losses until then. In fact, assuming that the Canadian jobs associated with these services pay $50,000 per year, back-of-the-envelope calculations imply that these imports of $1 billion might have affected roughly 20,000 jobs ($1 billion / $50,000). Alternatively, if such imports allowed the purchase of services produced by foreign workers receiving, say one fifth of the wages paid in Canada, then these imports of $1 billion might have affected roughly 100,000 jobs ($1 billion / $10,000). This would represent 0.7% of the 13.5 million Canadians employed as paid workers in 2004.[13]

Of course, these calculations are extremely crude for a variety of reasons. First, it is possible that the survey data measuring imports of commercial services from some countries may not cover all transactions that are actually taking place. Put simply, estimates of imports of computer, information and other business services might be biased downwards.[14] Conversely, these calculations do not take into account Canada's exports of these services to non-OECD countries, which may lead to some job creation. Furthermore, these calculations do not take account of the cost reductions that firms may achieve by contracting out some services. These cost reductions may increase firms' optimal level of output, which in turn may increase the demand for other types of labour within the company. They may also lead to price declines which may stimulate demand for other goods and services.[15] Finally, imports of services from certain non-OECD

13. Source: CANSIM Table 282-0012.
14. Comparisons of Canadian data with U.S. data have revealed in the past that estimates of imports of computer and information services from the United States are substantially lower than estimates of exports of these services from the United States to Canada. This underestimation of imports of computer and information services may thus apply to Canada's imports of these services from other countries as well.
15. One should also keep in mind that, all else equal, a *permanent* exogenous increase in (the flow of) imports of services should generate a once-and-for-all decrease in (the stock of) employment. Put simply, moving the level of imports of services from $x in year t to $x + $1 billion in year t+1 *as well as in subsequent years* might decrease employment by, say, 20,000 jobs between year t and year t+1. However, once this adjustment has been made (destruction of 20,000 jobs), employment is unlikely to decline further between year t+1 and subsequent years.

countries (e.g., China and India) might have increased substantially between 2004 and 2007 (or might increase substantially after 2007), thereby potentially making obsolete calculations based on 2004 data.

Nevertheless, jobs held in some occupations today are at risk of being contracted out to foreign firms or foreign affiliates in the near future and thus, might potentially be affected by service offshoring in subsequent years. We examine the relative importance of these jobs in the next section.

V. Jobs potentially affected by service offshoring

As Van Welsum and Reif (2005) point out, occupations are potentially affected by service offshoring share many characteristics. First, they make intensive use of information and communication technologies (ICT). Second, they produce an output that can be traded or transmitted by ICTs. Third, their knowledge content is highly codifiable. Fourth, they require no face-to-face contacts.

Using these four criteria, Van Welsum and Reif (2005) select a subset of Canadian occupations, based on the Standard Occupational Classification (SOC) of 1991, that are potentially affected by service offshoring. Because the occupation-level data in the Labour Force Survey (LFS) is based on the National Occupational Classification (NOC-S) of 2001, our subset of occupations is, with minor exceptions, identical to that of Van Welsum and Reif (2005).[16] It is presented in Appendix 2.

Among this subset of occupations potentially affected by service offshoring, we distinguish two groups: a) professional jobs potentially affected by service offshoring and, b) clerical jobs potentially affected by service offshoring. The former group includes jobs held by highly skilled workers such as engineers, architects, computer programmers, translators and journalists. The latter includes occupations (requiring a lower skill level) such as secretaries, data entry clerks and telephone operators.

Between 1987 and 2006—the period over which comparable LFS data on occupations are available—the share of jobs potentially affected by service offshoring fell slightly and varied between 20% and 23% (Figure 1). Because of their overrepresentation in clerical jobs, women are more likely than men to hold jobs that can potentially be contracted out abroad. However, as new cohorts of women moved away from these jobs, the percentage of women holding jobs potentially affected by service offshoring fell substantially: it dropped from 35% in the late 1980s to about 26% in 2006. The drop was observed in all age groups but was more pronounced among women under 35 (Figure 3). In contrast, men's propensity to hold such jobs remained virtually unchanged at about 13% in the aggregate. In most age groups, it showed virtually no trends (Figure 2).[17]

16. For instance, we replace the category "computer operators", used by Van Welsum and Reif (2005), by "computer and network operators and web technicians".
17. It rose slightly in the late 1990s for men aged 25 to 34 and, more recently (i.e., between 2005 and 2006), for those aged 35 to 44.

By far, the jobs most likely to be affected by service offshoring are found in service-producing firms operating in high-skill services (Figure 5).[18] Roughly half of the jobs in this sector were at risk of being contracted out abroad in 2006. At the other end of the spectrum, only 6% of jobs in retail trade, accommodation and food services—a low-paying sector—faced that risk (Figure 4). Between 12% and 14% of the jobs held in the goods sector and in other service-producing industries were potentially subject to foreign outsourcing in 2006. For jobs held in public services, the corresponding number is 16%. [19]

As Figures 2 and 3 suggest, these aggregate numbers hide important gender differences. First, while male university graduates are much more likely to be in jobs potentially affected by service offshoring than their male high school graduates, this is not the case for their female counterparts (Table 6, Figure 6). Second, while private sector male employees have a high propensity to be in these jobs only when employed in high-skill services, private sector female employees display a propensity of 20% or more in all sectors except retail trade, accommodation and food services.[20] Third, while men's risk of being in "offshorable" jobs increases monotonically with wages, the relationship between hourly wages and the share of jobs potentially affected by service offshoring has an inverted U-shape for women (Figure 7). Finally, women are, on average, almost twice as likely as men to hold jobs potentially subject to service offshoring (Table 6).

While the aforementioned statistics about the share of jobs potentially affected by service offshoring provide useful information about the relative risks faced by various groups workers in the economy, they leave unanswered a crucial question: to what extent have the jobs potentially subject to *service* offshoring been actually transferred abroad *so far*? In the next section, we attempt to shed light on this issue, using a wide variety of data sets.

VI. Employment and layoffs in jobs potentially affected by service offshoring

VI.1 Recent employment trends

All else equal, if service offshoring had a sizable impact on Canadian employment in the last few years, one would expect occupations potentially affected by it to display smaller employment growth than other occupations in recent years.

In Figure 8, we show that this is not necessarily the case. Between 1987 and 2006, employment in professional occupations potentially affected by service offshoring grew by 56%, i.e., more than the 34% growth rate observed for occupations not potentially affected by offshoring. However, employment in clerical occupations potentially affected by service offshoring fell by

18. In this study, high-skill services are defined as follows: information and cultural industries, finance and insurance, real estate and rental leasing, professional, scientific and technical services, management of companies and enterprises, administrative and support, waste management and remediation services.
19. In 2006, 1) primary industries and construction, 2) manufacturing, 3) retail trade, accommodation and food services, 4) high-skill services, 5) public services and, 6) other service-producing industries accounted for 9.5%, 15.5%, 16.4%, 18.4%, 26.0% and 14.1%, respectively, of all jobs held by employees aged 15 to 64 (excluding full-time students).
20. The high share of jobs potentially affected by service offshoring, which is found for women employed in primary industries and construction, is likely due to the overrepresentation of these women in clerical occupations.

10% during that period, thereby suggesting a potential role impact of service offshoring for this occupational group.[21]

We investigate the sources of this decline in Table 7. To do so, we document how employment in clerical occupations potentially affected by service offshoring evolved in various sectors of the economy. Overall, employment in these clerical occupations fell by roughly 138,000 between 1987 and 2006. However, most of the decline, i.e., roughly 86,000 jobs, took place between 1987 and 1994, a period during which service offshoring was likely negligible. Second, while some clerical jobs disappeared in manufacturing during the 1994-to-2006 period, fully 67,000 jobs were lost in these occupations in *public services*, a sector unlikely to have made substantial use of service offshoring over the past decade. Third, employment in these clerical occupations actually *rose* (although moderately) in the service sector during the 1994-to-2006 period. Hence, most of the decline in employment that took place between 1987 and 2006 among clerical occupations potentially affected by service offshoring either: a) occurred too early to be caused by service offshoring or b) took place outside of the commercial sector, where service offshoring is unlikely to have been important so far. Thus, while employment growth in these clerical occupations might have been stronger in the absence of service offshoring, service offshoring is unlikely to explain a substantial portion of the *net decrease in employment* (138,000 jobs lost) observed in these occupations between 1987 and 2006.

VI.2 Descriptive evidence on long double-differences

Assume that service offshoring was virtually non existent between 1987 and 1994. If it tended to reduce employment growth in some "offshorable" occupations, then industries that had a large share of these occupations in, say, 1994 to 1995, should have experienced smaller employment growth rates afterwards (after the mid-1990s) than they did during the 1987-to-1995 period. In other terms, employment growth in these industries should have *decelerated* between the 1987-to-1995 and the 1996-to-2006 periods. This implies a negative correlation between: 1) SHARE9495, an industry's share of jobs potentially affected by service offshoring in 1994 and 1995, and 2) the difference in average employment growth rates observed during the two sub-periods.

Formally, define the average employment growth rate of industry j between 1987 and 1995, G^j_{8795}, as follows:

$$(1) \qquad G^j_{8795} = [\ln(L^j_{95}) - \ln(L^j_{87})] / 8$$

where $\ln(L^j_{95})$ and $\ln(L^j_{87})$ are the natural logarithms of the level of employment of industry j in 1987 and 1995, respectively. Similarly, the average employment growth rate of industry j between 1996 and 2004, G^j_{9604}, is given by:

$$(2) \qquad G^j_{9606} = [\ln(L^j_{04}) - \ln(L^j_{96})\ ] / 10.$$

Differencing these two average employment growth rates yields ΔG^j:

21. In 2006, professional and clerical occupations potentially affected by service offshoring each accounted for 10% of total employment among paid workers aged 15 to 64 (full-time students excluded). Occupations not potentially affected by service offshoring accounted for the remaining 80%.

(3) $\Delta G^j = G^j_{9604} - G^j_{8795}$.

As mentioned above, we expect a negative correlation between ΔG^j and $SHARE9495_j$, the percentage of employees in industry j who were in jobs potentially affected by service offshoring in 1994 to 1995.

Table 8 shows that this is not the case. Based on a 3-digit level (NAICS 2002) industry classification, descriptive regressions of ΔG^j on $SHARE9495_j$ indicate a *positive* (rather than negative) correlation between these two variables.[22] This conclusion holds whether we attempt to correlate ΔG^j with: a) the percentage of employees of industry j who are in clerical jobs potentially affected by service offshoring or b) the percentage of employees of industry j who are in professional jobs potentially affected by service offshoring. Thus, there is no evidence that industries with a relatively large share of occupations subject to service offshoring in 1994 to 1995 saw their employment growth decelerate relative to other industries between the 1987-to-1995 period and the 1996-to-2006 period.

If service offshoring started to play a significant role in firms' decisions only recently, then comparisons of employment growth rates across the two aforementioned periods might not be very informative. A more meaningful exercise might involve a comparison of industry-specific employment growth rates across more recent periods. We implement this alternative by redefining ΔG^j and asking whether industries with a high percentage of jobs potentially affected by service offshoring in 1994-1995 saw their employment growth decelerate between the 1994-to to-2000 period and the 2000-to-2006 period.

When all industries (except public services) are considered, there is essentially no correlation between the redefined version of ΔG^j, on the one hand, and $SHARE9495_j$, however defined, on the other hand (Table 8). In all cases, parameter estimates of $SHARE9495_j$ equal 0. The only cases where a negative correlation emerges is when attention is restricted to service-producing industries. However, the parameter estimates are measured imprecisely, thereby raising the possibility that they might not differ from 0.[23]

In Table 9, we replicate Table 8 using a 4-digit industry classification. Once again, we find no statistically significant correlation between ΔG^j and $SHARE9495_j$. Taken together, the results presented in Tables 8 and 9 thus provide little evidence that industries that had a fairly high share of jobs potentially affected by service offshoring in the mid-1990s saw their employment growth rates decelerate (relative to those of other industries) in subsequent years.

22. To minimize concerns regarding measurement error for $SHARE9495_j$, industries with a sample size of less than 100 observations (using the Labour Force Survey of March and September) in 1994 to 1995 are omitted from these regressions.
23. The parameter estimates imply that a 10 percentage-point increase in an industry's share of employees who were in clerical jobs potentially affected by service offshoring in 1994 to 1995 is associated with a 0.34 percentage-point decrease (i.e., -0.034 times 10) in the employment growth rate of that industry.

VI.3 Employment growth and growth in imports of computer, information and other business services from non-OECD countries

An alternative way of searching for evidence of a link between service offshoring and employment is to correlate employment growth and growth in imports of computer, information and other business services, especially those coming from non-OECD countries. If imports of these services negatively affected employment in recent years, then occupations potentially affected by service offshoring (and thus, by these imports) should, all else equal, have displayed smaller employment growth in industries that experienced substantial increases of these imports than similar occupations located in other industries. Once again, this should be the case especially for imports of these services coming from non-OECD countries, where wages are relatively low.[24]

Define the average employment growth rate of occupation k in industry j between 1999 to 2000 and 2003 to 2004, $\Delta \ln L^{jk}_{_0004}$, as follows:

$$(4) \qquad \Delta \ln L^{jk}_{_0004} \equiv [\ln(L^{jk}_{04}) - \ln(L^{jk}_{00})] / 4$$

where k denotes the three following occupational groups: 1) occupations potentially affected by service offshoring, 2) clerical occupations potentially affected by service offshoring, and 3) professional occupations potentially affected by service offshoring.

For each of these three occupational groups, we estimate the following regression:

$$(5) \qquad \Delta \ln L^{jk}_{_0004} = \alpha_0 + \alpha_1 \Delta \ln_M^{j}_{_0004} + \alpha_2 \Delta \ln_GDP^{j}_{_0004} + \alpha_3 \Delta SHARE^{j}_{_0004} + u^{jk}$$

where $\Delta \ln_GDP^{j}_{_0004}$ denotes the average real gross domestic product (GDP) growth in industry j between 1999 to 2000 and 2003 to 2004, $\Delta \ln_M^{j}_{_0004}$ denotes the average growth rate of imports of computer, information and other business services in industry j during that period, and $\Delta SHARE^{j}_{_0004}$ measures the change in the share of these imports that are coming from non-OECD countries.[25] Equation (5) is estimated on all industries that imported computer, information and other business services both in 1999 to 2000 and in 2003 to 2004.

We also estimate a variant of equation (5) that is restricted to the subset of industries that imported computer, information and other business services *from non-OECD* countries both in 1999-2000 and in 2003-2004. It takes the following form:

$$(6) \qquad \Delta \ln L^{jk}_{_0004} = \alpha_0 + \alpha_1 \Delta \ln_M^{j}_{_0004} + \alpha_2 \Delta \ln_GDP^{j}_{_0004} + \alpha_3 \Delta \ln_M2^{j}_{_0004} + u^{jk}$$

24. In fact, the growth of imports coming from these countries is more likely to represent an exogenous increase in service offshoring (due to computer-based technologies and/or a greater supply of skilled workers) than the growth of imports from OECD countries.

25. $\Delta \ln_GDP^{j}_{_0004}$, $\Delta \ln_IMPORTS^{j}_{_0004}$ and $\Delta SHARE^{j}_{_0004}$ are all constructed by taking first-differences and dividing the resulting numbers by 4.

where $\Delta \ln_M2^j{}_{0004}$ denotes the average growth rate of imports of computer, information and other business services from non-OECD countries in industry j between 1999 to 2000 and 2003 to 2004.[26]

Both equations are based on the NAICS 1997 industry classification and are estimated either at the 3-digit level or at the 4-digit level. For both equations, we essentially ask the following question: controlling for GDP growth and the growth of imports of the aforementioned services (which are likely to be both determined by the growth in the demand for an industry's product), did industries that increased the relative importance of imports (of the aforementioned services) coming from non-OECD countries displayed smaller employment growth in occupations potentially affected by service offshoring than other industries? In other words, is α_3 negative and statistically significant?

The results of equations (5) and (6) are shown in Tables 10 and 11, respectively. One striking fact in Table 10 is the lack of robustness of the parameter estimates observed when moving from a 4-digit industry classification to a broader one. More important, Table 10 shows little evidence that α_3 is negative and statistically significant. In fact, a negative and almost significant relationship between employment growth and growth of imports coming from non-OECD countries is observed only for professional occupations potentially affected by service offshoring and when using a 3-digit industry classification.

This negative relationship becomes statistically significant at conventional levels when attention is restricted to industries that imported computer, information and other business services *from non-OECD* countries both in 1999 to 2000 and in 2003 to 2004 (Table 10). The results for this sub-sample suggests that the elasticity of employment in professional occupations subject to service offshoring with respect to imports of computer, information and other business services from non-OECD countries amounts to -0.098. In other words, a 10% increase in these imports appears to be associated with a 1% decrease in employment in these occupations. However, since these results are based on a fairly small number of industries (N=22), they must be interpreted with a great deal of caution.[27]

VI.4 Layoffs in occupations potentially affected by service offshoring

So far, we have considered only net changes in employment in specific occupations or in industries with a large share of occupations potentially subject to offshoring. Since net changes in employment mask tremendous volumes of job creation and job destruction, we investigate whether data on layoffs provide any signal of a link between service offshoring and job loss.

To do so, we use the Survey of Labour and Income Dynamics (SLID) and examine how layoff rates have evolved over the 1993-to-2004 period in the three occupational groups defined above. Since SLID does not allow us to distinguish permanent layoffs from temporary layoffs, our

26. Note that equation (6) cannot be estimated for the sample of industries used for equation (5) since some of the industries included in the latter equation had no imports from non-OECD countries at the beginning of the period. For these industries, $\Delta \ln_M2^j{}_{0004}$ cannot be computed.

27. Another reason for being cautious about these results is the lack of robustness of the parameter estimates across samples. For instance, when analyzing employment growth in clerical occupations potentially affected by service offshoring and using a 3-digit industry classification (Panels II of Tables 10 and 11), α_1 is positive and statistically significant in Table 10 while being negative and statistically significant in Table 11.

measure of layoff rates with this data set includes both types of layoffs. To smooth transitory fluctuations in layoff rates, we show moving averages for the 1994-to-2003 period.[28]

Figure 10a shows that layoff rates fell in all three occupational groups between 1994 and 1998. While layoff rates fell *more* in occupations *not* potentially affected by service offshoring than in other occupations, the difference might reflect a greater cyclical sensitivity of employment in the industries in which the former group of occupations is employed. More important, occupations potentially affected by service offshoring did not display any substantial increase in layoff rates between the late 1990s and the most recent years. The same story emerges whether we consider workers under 40 (Figure 10b) or their older counterparts (Figure 10c). Hence, data on layoffs by broad occupational group provide so far no clear signal of greater job destruction among occupations potentially affected by service offshoring than among other occupations.

Next, we examine how permanent layoff rates evolved in industries with a large share of jobs potentially affected by service offshoring, as compared to other industries. We do so using data from Statistics Canada's Longitudinal Worker File (LWF). First, we use data from the Labour Force Survey and classify (NAICS 2002) industries into three categories: 1) those with less than 10% of occupations potentially affected by service offshoring, 2) those with 10% to 33% of occupations potentially affected by service offshoring and, 3) those with one-third or more of occupations potentially affected by service offshoring. Then, we import the resulting industry classification into LWF.

Figure 11 shows that over the 1991-to-2002 period—the period over which comparable NAICS 2002 industry codes are available in LWF—industries with less than one-third of jobs potentially affected by service offshoring had *higher* permanent layoff rates than other industries. Permanent layoff rates in the former group fell by fully 2 percentage points during that period. In contrast, they changed very little in the latter group, except for the year 2001 where they rose temporarily. The smaller improvement in layoff rates in the latter group might be related to service offshoring. Alternatively, it may simply reflect a lower sensitivity of that group of industries to the business cycle.

VII. Employment in manufacturing, using a broader measure of offshoring

While recent discussions about foreign outsourcing have focused on service offshoring—defined as the offshore trade in arm's-length services (e.g., Bhagwati, Panagariya and Srinivasan, 2004)—previous empirical work on offshoring in the manufacturing sector (Feenstra and Hanson, 1996, 1999) has used a broader definition of foreign outsourcing: the share of intermediate goods and services (including manufactured components) that firms import from abroad. In this section, we examine whether this broader measure of offshoring is correlated with manufacturing employment.[29]

To investigate this issue, we ask the following question: did manufacturing industries that experienced an acceleration of offshoring growth between the 1983-to-1989 period and the 1994-

28. Layoff rates shown for 1994 (2003) are a simple average of layoff rates observed in 1993, 1994 and 1995 (2002, 2003 and 2004).

29. As Figure 11 shows, the share of intermediate goods and services that are imported has been trending upwards since the early 1970s before declining somewhat in recent years.

to-2000 period also experienced an acceleration/deceleration in employment growth between these two periods? To answer this question, we define:

(7a) $G^j_{8389} = [\ln(L^j_{89}) - \ln(L^j_{83}) / 6$

(7b) $G^j_{9400} = [\ln(L^j_{00}) - \ln(L^j_{94}) / 6$

(8a) $\Delta Out^j_{8389} = [Out^j_{89} - Out^j_{83}] / 6$

(8b) $\Delta Out^j_{9400} = [Out^j_{00} - Out^j_{94}] / 6$

(9a) $\Delta \ln GDP^j_{8389} = [\ln GDP^j_{89} - \ln GDP^j_{83}] / 6$

(9b) $\Delta \ln GDP^j_{9400} = [\ln GDP^j_{00} - \ln GDP^j_{94}] / 6$

and regress G^j, the average employment growth in industry j between year t and year t+6, on a constant, a binary indicator that equals 1 for the 1994-to-2000 period, $\Delta \ln GDP^j$, the change in the log of real GDP between t and t+6, a vector of industry-specific fixed effects, and ΔOut^j, the growth in offshoring in industry j between t and t+6.[30]

Table 10 shows the results. The first two columns indicate that, in the absence of industry controls, increases in offshoring (ΔOut^j) are positively correlated with increases in employment. However, this finding is not robust. After controlling for industry-specific fixed effects, the positive correlation is no longer statistically significant. This conclusion holds when we compare employment growth experienced by manufacturing industries between the 1983-to-1989 period and the 1993-to-1999 period. It suggests that industries that experienced the strongest increases in offshoring over the last two decades displayed strong employment growth, not because of offshoring *per se*, but because other factors that led these industries to have intrinsically high growth rates.

VIII. Conclusion

Concerns that international competition is driving jobs offshore are not recent. In the early 1980s, some analysts argued that many manufacturing jobs in OECD economies were being lost to developing countries. Recently, others have suggested that employers now use outsourcing abroad not only for manufacturing, but also for jobs in the service sector that have high skill requirements. These changes in firms' behaviour have potentially important implications for the type and the number of jobs available to Canadian workers.

In this study, we have assembled a wide variety of data sets in an attempt to produce a set of stylized facts regarding offshoring and the evolution of Canadian employment in recent years. Our main findings can be summarized as follows:

30. Regressions are performed on 67 manufacturing industries (defined at the 3-digit SIC80 level), thereby yielding 134 observations.

1) Up until 2004, Canada's imports of *computer, information and other business services* from non-OECD countries represented fairly small amounts and thus, were unlikely to be associated with substantial job losses;

2) Throughout the 1996-to-2004 period, Canada's exports of these commercial services to non-OECD countries exceeded its imports, thereby indicating that while some Canadian firms are increasingly involved in foreign outsourcing, others are also benefiting from foreign insourcing;

3) About 20% of Canadian jobs were potentially subject to service offshoring in 2006. Women are found in these jobs more often than men. The jobs most likely to be affected by service offshoring are found in high skill services;

4) While employment in clerical occupations potentially affected by service offshoring fell by 138,000 between 1987 and 2006, most of the decline in employment either: a) occurred too early to be caused by service offshoring or b) took place outside of the commercial sector, where service offshoring is unlikely to have been important so far;

5) There is no evidence that industries with a relatively large share of occupations subject to service offshoring in 1994 to 1995 saw their employment growth decelerate relative to other industries between the 1987-to-1995 and the 1996-to-2006 periods;

6) There is little evidence that occupations potentially affected by service offshoring have displayed smaller employment growth in industries that experienced substantial increases in imports of computer, information and other business services *from non-OECD countries* than similar occupations located in other industries. A negative and significant relationship between employment growth and growth in these imports coming from non-OECD countries is observed only for professional occupations potentially affected by service offshoring and when using a 3-digit industry classification. However, since these results are based on a fairly small number of industries, they must be interpreted with a great deal of caution;

7) The evolution of layoff rates by occupation provides *so far* no clear signal of a link between service offshoring and job loss;

8) After controlling for industry-specific fixed effects, manufacturing industries that experienced strong growth in offshoring (as measured by increases in the share of intermediate goods and services that they imported) during the 1983-to-1989 and the 1994-to-2000 periods did not experience employment growth rates that differed relative to those of other industries.

Several limitations must be noted. First, some of the data presented in this study end between 2000 and 2004 and thus, might not represent accurately recent developments in some sectors of the economy.[31]

Second, whether we measure offshoring using data from the Balance of Payments Division or from input-output tables, it is unlikely that these data, when disaggregated at a detailed industry level, are measured without error. If so, such measurement error will bias our results against

31. This is especially true in light of the strong appreciation of the Canadian dollar in recent years.

finding a statistically significant correlation between offshoring, on the one hand, and employment, one the other.

Third, even if these data were measured without error, our results must be interpreted as reflecting conditional correlations rather than causal impacts.[32] As mentioned earlier, a thorough analysis of the causal impact of offshoring on employment would require longitudinal firm-level data with covariates that could potentially be used as instrumental variables to correct measures of offshoring for endogeneity.

Fourth, in recent years as well as in any previous periods, some Canadian employers might have decided to expand their output by locating new establishments in foreign countries rather than in Canada. If these new establishments do not export goods and services to Canada, then the "job losses" associated with these location decisions cannot be assessed.

While these caveats should be kept in mind, virtually all of the correlations presented in this study point in the same direction. They suggest that if offshoring has had an impact on Canadian employment so far, this impact is likely to be fairly small and thus, unlikely to be detected with the industry-level or occupation-level data used in this study. Given Canadians' concern about job security and the possibility that our results might be influenced by measurement error, this suggests that developing in the near future better data on offshoring is a prerequisite for a thorough understanding of its potential impact on Canadian employment in the years to come.

32. For instance, a thorough analysis of employment trends in manufacturing requires controlling for industry-specific exchange rate movements as well as the elimination of tariffs between Canada and the United States over the 1989-to-1999 period.

Table 1 Canada's imports and exports of commercial services, by type of service and affiliation, 1996 to 2004

	1996	1997	1998	1999	2000	2001	2002	2003	2004
	millions of dollars								
I. Imports									
A) Offshore trade in arm's-length services									
Commercial services	10,814	11,697	12,867	12,790	13,372	14,814	16,232	16,153	17,442
Computer and information services	403	458	662	843	838	997	1,330	1,595	1,551
Other business services	3,669	3,696	4,089	4,122	4,880	5,039	5,674	5,474	6,114
Other commercial services	6,743	7,543	8,116	7,824	7,653	8,778	9,228	9,083	9,777
B) Transactions with affiliated parties									
Commercial services	11,567	12,961	15,174	17,321	18,993	19,662	20,671	22,778	21,443
Computer and information services	318	496	449	451	497	438	715	683	867
Other business services	7,294	7,955	9,218	10,134	10,884	10,900	9,409	10,545	9,570
Other commercial services	3,955	4,511	5,506	6,736	7,612	8,325	10,547	11,550	11,006
C) All transactions									
Commercial services	22,381	24,658	28,041	30,110	32,366	34,477	36,903	38,930	38,885
Computer and information services	721	954	1,111	1,294	1,335	1,435	2,045	2,278	2,418
Other business services	10,963	11,651	13,307	14,256	15,764	15,939	15,083	16,020	15,684
Other commercial services	10,698	12,053	13,623	14,560	15,266	17,103	19,775	20,633	20,783
II. Exports									
A) Offshore trade in arm's-length services									
Commercial services	12,273	14,010	15,703	16,120	16,728	17,067	18,870	18,026	18,570
Computer and information services	550	884	1,272	2,156	2,711	2,659	2,326	2,447	2,554
Other business services	5,094	5,795	6,430	5,832	6,284	6,019	7,677	6,807	7,393
Other commercial services	6,628	7,331	8,002	8,133	7,733	8,389	8,867	8,772	8,623
B) Transactions with affiliated parties									
Commercial services	7,085	7,911	10,179	11,363	14,373	14,477	15,376	16,998	15,941
Computer and information services	524	615	781	807	893	950	1,231	1,420	1,530
Other business services	5,060	5,533	6,791	7,860	9,758	8,992	8,199	9,691	8,954
Other commercial services	1,500	1,763	2,607	2,696	3,722	4,536	5,947	5,887	5,457
C) All transactions									
Commercial services	19,357	21,921	25,882	27,483	31,101	31,545	34,246	35,024	34,511
Computer and information services	1,074	1,499	2,053	2,963	3,604	3,609	3,557	3,867	4,085
Other business services	10,155	11,328	13,220	13,691	16,042	15,011	15,875	16,498	16,347
Other commercial services	8,128	9,094	10,609	10,829	11,455	12,925	14,814	14,660	14,080

Notes: Other business services include : 1) non-financial commissions, 2) equipment rentals, 3) management services, 4) advertising and related services, 5) research and development, 6) architectural, engineering and other technical services, 7) miscellaneous services to business, and 8) audio-visual services.
Other commercial services include : 1) communication services, 2) construction services, 3) insurance services, 4) other financial services, 5) royalties and license fees, and 6) personal, cultural and recreational services.

Source: Statistics Canada, Balance of Payments Division.

Table 2 Canada's imports and exports of computer and information services, by country, 1996 to 2004[1]

	1996	1997	1998	1999	2000	2001	2002	2003	2004
	millions of dollars								
I. Imports									
All countries	721	954	1,111	1,294	1,335	1,435	2,045	2,278	2,418
United States	647	810	995	1,200	1,231	1,339	1,952	2,119	2,224
United Kingdom	44	86	66	43	47	15	20	39	56
Japan	1	5	2	2	2	2	4	6	3
Other OECD[2] countries	19	39	42	32	34	59	40	82	98
China and India	0	4	1	1	2	1	13	16	20
Other countries	10	10	5	16	19	19	16	17	17
II. Exports									
All countries	1,074	1,499	2,052	2,963	3,604	3,609	3,557	3,867	4,085
United States	770	1,138	1,500	2,193	2,791	2,755	2,647	2,976	2,967
United Kingdom	91	103	199	144	218	223	217	181	181
Japan	31	37	34	60	76	74	97	64	63
Other OECD countries	126	136	237	212	332	429	462	472	628
China and India	7	16	28	17	11	9	19	8	8
Other countries	49	70	55	337	176	118	116	167	239
III. Balances									
All countries	354	545	941	1,669	2,269	2,174	1,512	1,589	1,667
United States	123	328	505	994	1,560	1,416	695	857	743
United Kingdom	48	16	133	101	171	208	197	142	125
Japan	30	32	32	58	74	72	93	58	60
Other OECD countries	107	97	195	180	298	370	422	389	530
China and India	7	11	26	16	9	8	6	-8	-12
Other countries	39	60	50	320	157	99	100	150	222

1. All transactions.
2. Organisation for Economic Co-operation and Development.
Source: Statistics Canada, Balance of Payments Division.

Table 3 Canada's imports and exports of other business services, by country, 1996 to 2004[1]

	1996	1997	1998	1999	2000	2001	2002	2003	2004
	millions of dollars								
I. Imports									
All countries	10,963	11,651	13,307	14,256	15,764	15,939	15,083	16,020	15,684
United States	9,360	9,776	11,019	11,947	13,372	12,554	12,026	12,643	12,459
United Kingdom	349	507	728	732	616	503	582	726	553
Japan	89	120	122	98	96	109	348	164	138
Other OECD[2] countries	741	781	827	963	1,155	1,886	1,310	1,568	1,549
China	32	50	55	37	40	57	45	88	51
India	22	15	16	9	20	34	29	21	48
Other countries	369	402	540	470	465	796	743	808	886
II. Exports									
All countries	10,155	11,328	13,220	13,691	16,042	15,011	15,875	16,498	16,347
United States	6,216	6,903	8,127	9,010	10,941	9,658	9,872	10,207	10,023
United Kingdom	275	323	450	514	540	510	535	498	435
Japan	146	196	229	217	298	275	278	215	196
Other OECD countries	1,137	1,426	1,803	1,891	2,065	2,089	2,178	2,539	2,395
China	184	195	186	222	252	249	215	288	267
India	43	50	49	66	68	105	115	90	71
Other countries	2,154	2,235	2,376	1,771	1,878	2,125	2,682	2,660	2,959
III. Balances									
All countries	-808	-323	-87	-564	277	-928	792	478	663
United States	-3,145	-2,873	-2,891	-2,938	-2,431	-2,897	-2,154	-2,436	-2,437
United Kingdom	-75	-184	-279	-218	-76	7	-47	-228	-117
Japan	57	75	107	120	202	167	-70	51	57
Other OECD countries	396	646	976	928	910	203	868	970	846
China	153	144	131	185	212	192	170	200	216
India	21	35	33	57	48	71	86	69	24
Other countries	1,785	1,833	1,836	1,301	1,412	1,329	1,939	1,852	2,073

1. All transactions.
2. Organisation for Economic Co-operation and Development.
Source: Statistics Canada, Balance of Payments Division.

Table 4 Canada's imports and exports of computer and information services, by industry, 1999 to 2004[1]

	1999	2000	2001	2002	2003	2004
	millions of dollars					
I. Imports						
Manufacturing	89	107	104	112	142	189
Other goods producing industries	20	29	27	33	48	28
Trande and transportation	97	125	89	94	200	364
Information, culture and arts	568	461	463	624	655	587
Finance and insurance	99	80	105	89	97	130
Professional, scientific and technical services	366	475	571	1,005	1,046	1,045
Management of companies and enterprises	14	18	21	26	17	13
Other services	41	40	55	62	73	61
All industries	1,294	1,335	1,435	2,045	2,278	2,418
ICT[2] sector	584	580	674	1,120	1,271	1,273
II. Exports						
Manufacturing	28	74	74	121	206	145
Other goods producing industries	0	1	9	1	1	17
Trande and transportation	68	80	217	240	91	151
Information, culture and arts	895	862	1,171	914	1,245	1,603
Finance and insurance	53	30	42	40	37	131
Professional, scientific and technical services	1,871	2,498	2,026	2,180	2,193	1,939
Management of companies and enterprises	11	13	31	16	36	17
Other services	36	47	37	47	58	81
All industries	2,963	3,604	3,609	3,557	3,867	4,085
ICT sector	2,553	3,203	3,117	3,114	3,325	3,445

1. All transactions.
2. Information and communication technologies.
Source: Statistics Canada, Balance of Payments Division.

Table 5 Canada's imports and exports of other business services, by industry, 1999 to 2004[1]

	1999	2000	2001	2002	2003	2004
	millions of dollars					
I. Imports						
Manufacturing	7,428	7,899	7,476	6,381	6,344	6,067
Other goods producing industries	470	444	506	740	885	920
Trande and transportation	1,089	1,328	1,355	1,191	1,387	1,479
Information, culture and arts	2,255	2,837	2,403	2,554	2,497	2,776
Finance and insurance	516	525	819	837	863	829
Professional, scientific and technical services	1,554	1,879	2,578	2,244	2,785	2,363
Management of companies and enterprises	164	95	133	140	212	239
Other services	780	757	670	996	1,046	1,011
All industries	14,256	15,764	15,939	15,083	16,020	15,684
ICT[2] sector	1,943	2,670	2,296	1,625	1,797	1,336
II. Exports						
Manufacturing	3,594	4,600	3,390	3,427	3,362	3,541
Other goods producing industries	335	347	472	537	498	681
Trande and transportation	2,466	2,586	2,007	1,625	1,963	1,577
Information, culture and arts	2,597	2,939	2,325	2,305	2,156	2,198
Finance and insurance	171	198	678	793	801	803
Professional, scientific and technical services	3,483	4,356	4,725	5,337	5,950	5,763
Management of companies and enterprises	196	202	582	583	517	502
Other services	850	814	832	1,268	1,250	1,282
All industries	13,691	16,042	15,011	15,875	16,498	16,347
ICT sector	3,497	4,815	3,193	2,472	3,055	2,927

1. All transactions.
2. Information and communication technologies.
Source: Statistics Canada, Balance of Payments Division.

Table 6 Percentage of employees in jobs potentially affected by service offshoring, 2006[1]

	Men	Women	Both sexes
		percentage	
Age			
15 to 24 years old	8.0	18.2	12.7
25 to 34 years old	16.9	26.0	21.3
35 to 44 years old	16.7	27.7	22.1
45 to 54 years old	12.6	28.6	20.8
55 to 64 years old	11.7	25.0	18.2
Education			
Less than high school	1.9	10.4	5.4
High school	5.5	28.6	15.6
Post-secondary	14.2	28.4	22.0
University degree	35.1	26.1	30.4
Industry			
Primary industries and construction	6.3	50.7	13.6
Manufacturing	8.0	20.6	11.6
Retail trade, accommodation and food services	3.3	8.3	6.2
High-skill services[2]	46.8	59.0	53.2
Public services	13.5	17.4	16.3
Other service-producing industries[3]	5.4	25.9	13.2
Unionized?			
No	17.0	30.8	23.7
Yes	8.2	17.2	12.6
Hourly wages (2006$)			
<= $10.00	5.3	11.9	9.4
$10.00 to $14.99	7.9	27.3	18.7
$15.00 to $19.99	8.9	33.7	21.5
$20.00 to $24.99	12.2	32.2	21.0
$25.00 or more	24.2	25.4	24.6
Overall	14.1	26.2	20.0

1. Full-time students are excluded.
2. High-skill services include: information and cultural industries, finance and insurance, real estate and rental leasing, professional, scientific and technical services, management of companies and enterprises and administrative and support, waste management and remediation services.
3. Other service-producing industries include: wholesale trade, transportation and warehousing, arts, entertainment and recreation and other services (except public administration).

Source: Statistics Canada, Labour Force Survey (March and September files).

Table 7 Employment in clerical occupations potentially affected by service offshoring, by industry, 1987 to 20

Industry	Primary industries and construction	Manufacturing	Service sector	Public services[2]	All industries
Year					
1987	74,090	133,010	752,787	387,046	1,346,932
1988	82,719	132,958	749,794	395,315	1,360,786
1989	85,148	128,737	793,083	423,713	1,430,679
1990	86,455	136,191	768,144	431,642	1,422,432
1991	85,708	125,052	722,771	429,117	1,362,647
1992	84,517	111,546	710,695	433,005	1,339,762
1993	77,331	100,826	738,466	432,528	1,349,150
1994	75,157	102,127	675,946	407,998	1,261,227
1995	74,128	100,042	687,622	407,011	1,268,802
1996	68,890	108,266	674,585	394,738	1,246,479
1997	67,771	101,284	665,706	379,602	1,214,363
1998	65,955	99,179	668,542	374,960	1,208,636
1999	63,180	103,909	663,816	364,196	1,195,100
2000	64,206	98,447	634,586	354,874	1,152,112
2001	67,984	96,212	656,550	341,126	1,161,872
2002	59,522	92,936	661,801	338,149	1,152,407
2003	60,656	89,830	652,557	348,038	1,151,081
2004	67,291	95,857	682,560	361,354	1,207,061
2005	68,243	90,641	722,227	336,107	1,217,217
2006	82,794	88,279	696,553	341,045	1,208,670
1987 to 2006	8,704	-44,732	-56,234	-46,001	-138,262
1987 to 1994	1,067	-30,883	-76,841	20,952	-85,705
1994 to 2006	7,637	-13,849	20,608	-66,953	-52,557

1. Employees aged 15 to 64. Full-time students are excluded.
2. Public services include: educational services, health care and social assistance, and public administration.
Source: Statistics Canada, Labour Force Survey (March and September files).

Table 8 Employment growth and the percentage of jobs potentially affected by service offshoring in 1994 to 1995

3-digit industries	All industries		Service-producing industries	
	β	t value	β	t value
I. Occupations potentially affected by service offshoring				
A) 1996 to 2006 versus 1987 to 1995	0.026	1.28	0.026	1.28
B) 2000 to 2006 versus 1994 to 2000	0.000	0.01	-0.032	-0.96
II. Clerical occupations potentially affected by service offshoring				
A) 1996 to 2006 versus 1987 to 1995	0.065	1.52	0.072	1.70
B) 2000 to 2006 versus 1994 to 2000	0.001	0.01	-0.062	-0.88
III. Professional occupations potentially affected by service offshoring				
A) 1996 to 2006 versus 1987 to 1995	0.031	0.91	0.026	0.79
B) 2000 to 2006 versus 1994 to 2000	0.000	0.00	-0.049	-0.89

Notes: The dependent variable is the change in industry-specific employment growth rates between two periods. The explanatory variables include a constant term and the percentage of employees in jobs potentially affected by service offshoring in 1994 to 1995. The numbers above show the parameter estimates for this latter variable, which is defined in three different ways. The number of observations equals 88 for all industries and 53 for service-producing industries. In all regressions, public services are excluded.

Source: Statistics Canada, authors' calculations from the Labour Force Survey (March and September files).

Table 9 Employment growth and the percentage of jobs potentially affected by service offshoring in 1994 to 1995

4-digit industries	All industries		Service-producing industries	
	β	t value	β	t value
I. Occupations potentially affected by service offshoring				
A) 1996 to 2006 versus 1987 to 1995	-0.019	-0.75	-0.001	-0.02
B) 2000 to 2006 versus 1994 to 2000	-0.013	-0.34	-0.032	-0.71
II. Clerical occupations potentially affected by service offshoring				
A) 1996 to 2006 versus 1987 to 1995	-0.059	-1.16	-0.019	-0.29
B) 2000 to 2006 versus 1994 to 2000	0.055	0.68	-0.034	-0.35
III. Professional occupations potentially affected by service offshoring				
A) 1996 to 2006 versus 1987 to 1995	-0.011	-0.30	0.008	0.17
B) 2000 to 2006 versus 1994 to 2000	-0.060	-1.02	-0.056	-0.82

Notes: The dependent variable is the change in industry-specific employment growth rates between two periods. The explanatory variables include a constant term and the percentage of employees in jobs potentially affected by service offshoring in 1994 to 1995. The numbers above show the parameter estimates for this latter variable, which is defined in three different ways. The number of observations equals 216 for all industries and 120 for service-producing industries. In all regressions, public services are excluded.

Source: Statistics Canada, authors' calculations from the Labour Force Survey (March and September files).

Table 10 Employment growth and changes in the share of imports of computer, information and other business services coming from non-OECD[1] countries (ΔSHARE)

	ΔSHARE		Δln_M		Δln_GDP[2]	
	β	t value	β	t value	β	t value
I. Occupations potentially affected by service offshoring						
4-digit industries (N=89)	-0.015	-0.02	0.020	0.33	0.223	1.07
3-digit industries (N=30)	0.351	0.82	0.107	2.61	0.321	1.71
II. Clerical occupations potentially affected by service offshoring						
4-digit industries (N=88)	0.523	0.62	-0.055	-0.73	0.617	2.38
3-digit industries (N=30)	0.916	1.04	0.346	4.09	-0.633	-1.64
III. Professional occupations potentially affected by service offshoring						
4-digit industries (N=84)	-0.417	-0.69	0.055	1.02	-0.227	-1.23
3-digit industries (N=30)	-0.995	-1.55	0.000	0.01	1.195	4.24

1. Organisation for Economic Co-operation and Development.
2. Gross Domestic Product.

Notes: The dependent variable is the change in the log of employment between 1999 to 2000 and 2003 to 2004 in a given industry and for a given set of occupations. Three set of occupations are used and are identified in Panels I, II and III.

The explanatory variables include a constant term, the change in the log of imports of computer, information and other business services between 1999 to 2000 and 2003 to 2004 (Δln_M), the change in the share of these imports coming from non-OECD countries (ΔSHARE), and the change in the log of gross domestic product (in 1997 constant dollars) between 1999 to 2000 and 2003 to 2004 (Δln_GDP).

Regressions are run using industries defined either at the 3-digit level or at the 4-digit level. The dependent variable and the explanatory variables are divided by 4 to convert them to an annual basis. Regressions are restricted to industries that imported computer, information and other business services both at the beginning and at the end of the period.

Source: Statistics Canada, authors' calculations from the Labour Force Survey (March and September files), Cansim Table 379-0017 and data from the Balance of Payments Division.

Table 11 Employment growth and growth of imports of computer, information and other business services from non-OECD[1] countries (Δln_M2)

	Δln_M2		Δln_M		Δln_GDP[2]	
	β	t value	β	t value	β	t value
I. Occupations potentially affected by service offshoring						
4-digit industries (N=35)	-0.082	-1.33	-0.040	-0.28	0.078	0.20
3-digit industries (N=22)	-0.020	-0.64	-0.128	-1.52	0.657	2.25
II. Clerical occupations potentially affected by service offshoring						
4-digit industries (N=35)	-0.008	-0.11	-0.237	-1.35	0.385	0.81
3-digit industries (N=22)	0.012	0.29	-0.261	-2.33	1.052	2.71
III. Professional occupations potentially affected by service offshoring						
4-digit industries (N=33)	-0.006	-0.15	-0.060	-0.72	0.168	0.78
3-digit industries (N=22)	-0.098	-3.10	-0.091	-1.05	0.554	1.86

1. Organisation for Economic Co-operation and Development.
2. Gross Domestic Product .

Notes: The dependent variable is the change in the log of employment between 1999-2000 and 2003-2004 in a given industry and for a given set of occupations. Three set of occupations are used and are identified in Panels I, II and III.

The explanatory variables include a constant term, the change in the log of imports of computer, information and other business services between 1999 to 2000 and 2003 to 2004 (Δln_M), the change in the log of these imports coming from non-OECD countries (Δln_M2), and the change in the log of gross domestic product (in 1997 constant dollars) between 1999 to 2000 and 2003 to 2004 (Δln_GDP).

Regressions are run using industries defined either at the 3-digit level or at the 4-digit level. The dependent variable and the explanatory variables are divided by 4 to convert them to an annual basis. Regressions are restricted to industries that imported computer, information and other business services *from non-OECD countries* both at the beginning and at the end of the period.

Source: Statistics Canada, authors' calculations from the Labour Force Survey (March and September files), Cansim Table 379-0017 and data from the Balance of Payments Division.

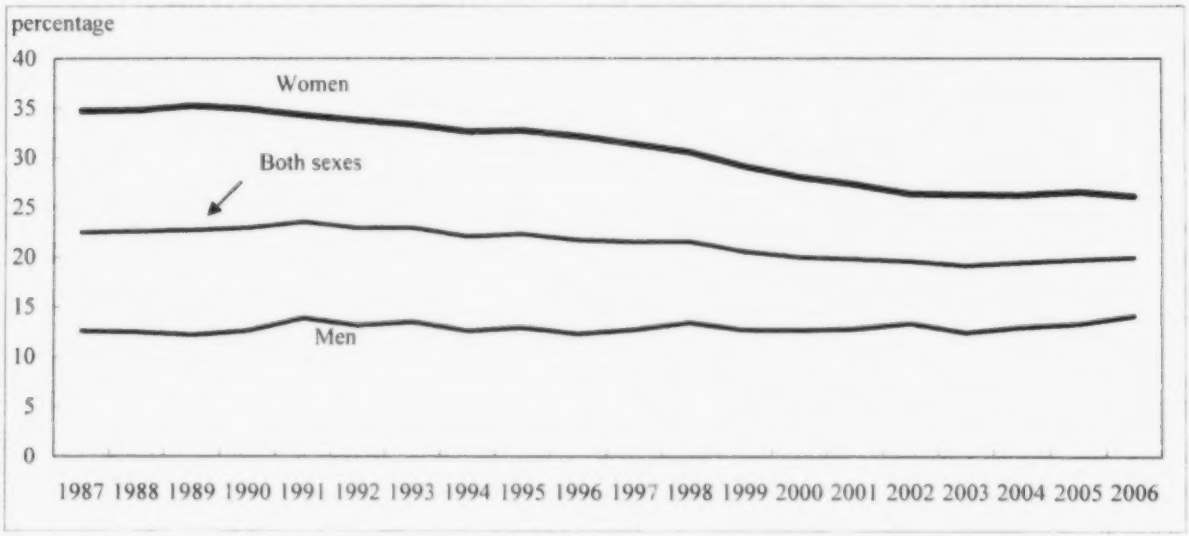
Table 12 Offshoring and employment growth in manufacturing

	No industry fixed effects		Industry fixed effects	
	β	t value	β	t value
I. 1983 to 1989 versus 1994 to 2000				
Period_1994 to 2000 = 1	-0.743	-0.99	-0.657	-0.77
$\Delta \ln GDP^j$	0.254	3.60	0.391	2.34
ΔOut^j	0.546	1.61	0.405	0.72
II. 1983 to 1989 versus 1993 to 1999				
Period_1993 to 1999 = 1	-1.276	-1.75	-1.255	-1.98
$\Delta \ln GDP^j$	0.229	3.15	0.286	2.11
ΔOut^j	0.382	1.12	0.134	0.35

Note: see text for details.

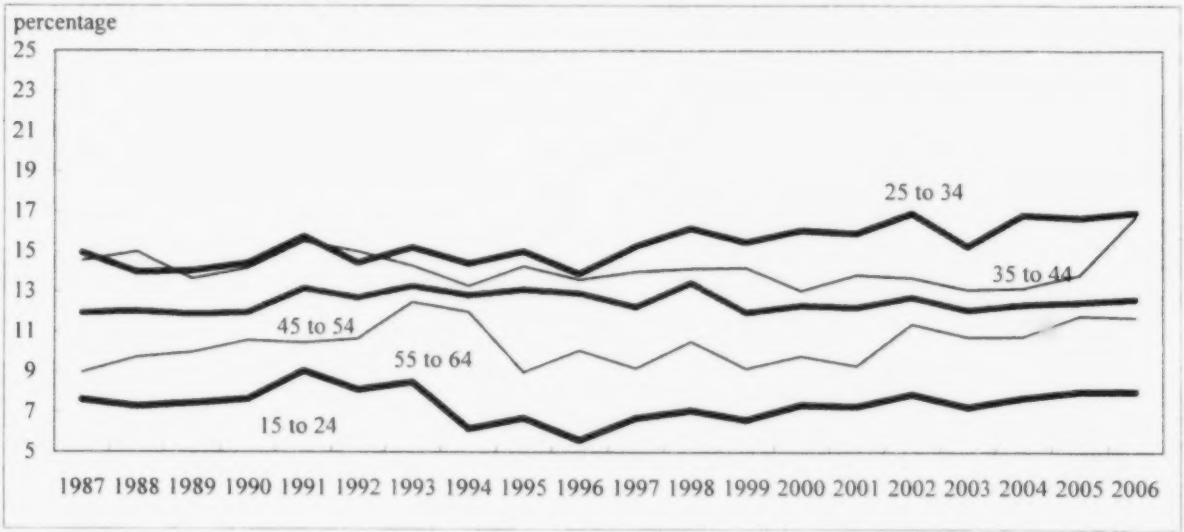
Source: Statistics Canada, authors' calculations from Input-Output tables and from the Survey of Employment, Payroll and Hours.

Figure 1 Percentage of employees in jobs potentially affected by service offshoring, 1987 to 2006[1]



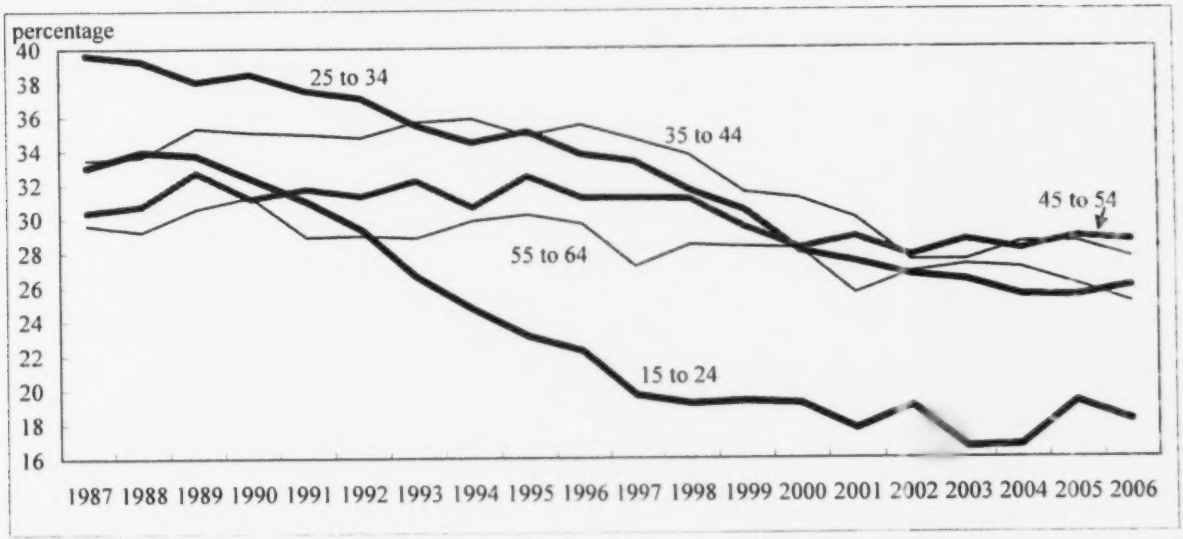
1. Employees aged 15 to 64. Full-time students are excluded.
Source: Statistics Canada, Labour Force Survey (March and September files).

Figure 2 Percentage of male employees in jobs potentially affected by service offshoring, by age, 1987 to 2006[1]



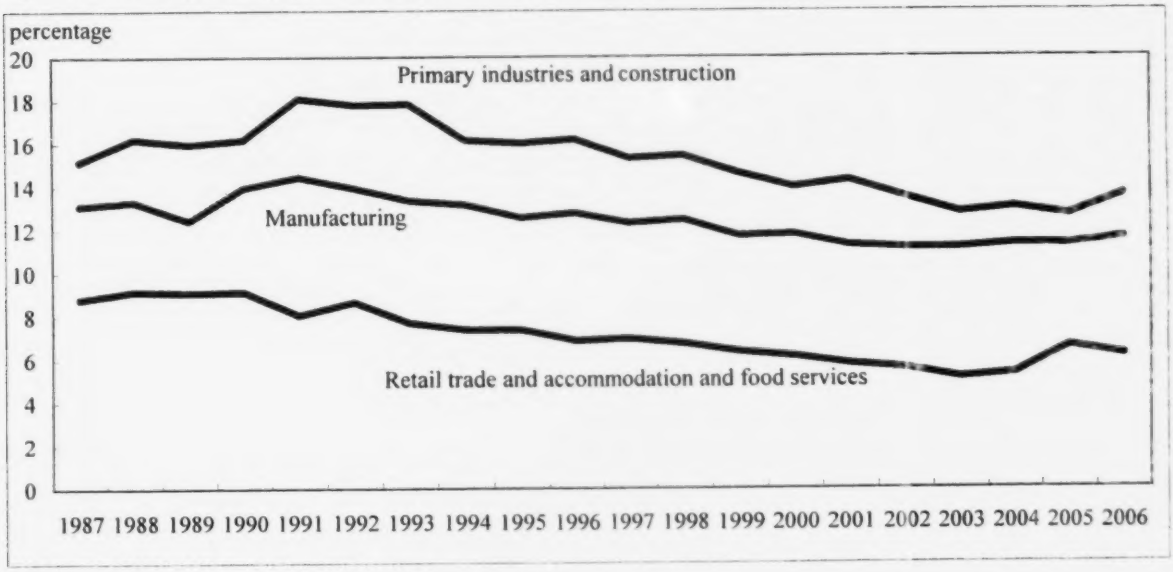
1. Employees aged 15 to 64. Full-time students are excluded.
Source: Statistics Canada, Labour Force Survey (March and September files).

Figure 3 Percentage of female employees in jobs potentially affected by service offshoring, by age, 1987 to 2006[1]



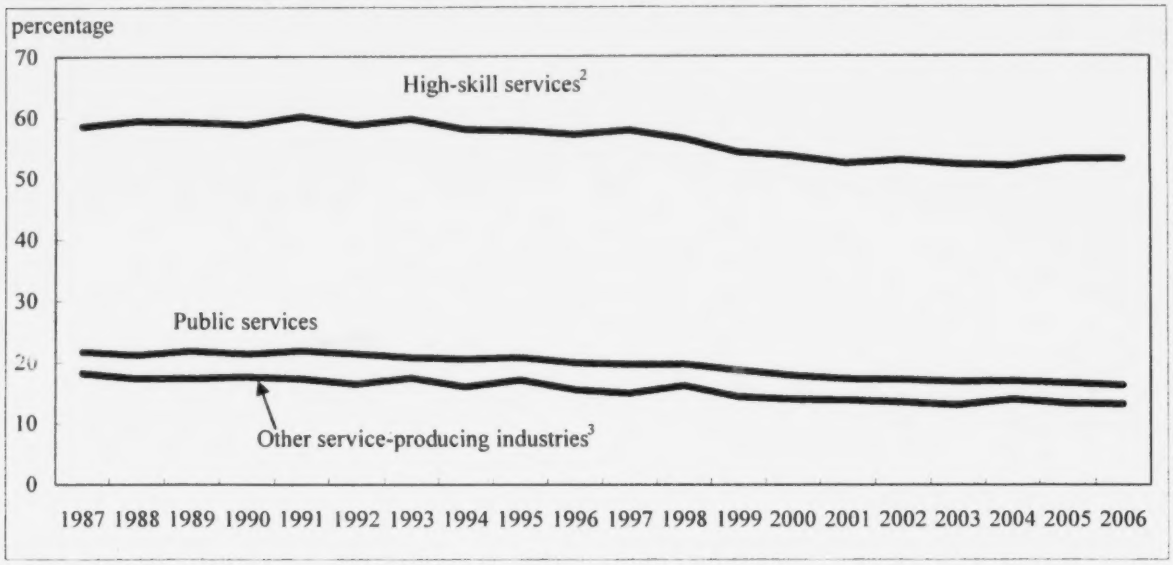
1. Employees aged 15 to 64. Full-time students are excluded.
Source: Statistics Canada, Labour Force Survey (March and September files).

Figure 4 Percentage of employees in jobs potentially affected by service offshoring, by industry, 1987 to 2006[1]



1. Employees aged 15 to 64. Full-time students are excluded.
Source: Statistics Canada, Labour Force Survey (March and September files).

Figure 5 Percentage of employees in jobs potentially affected by service offshoring, by industry, 1987 to 2006[1]



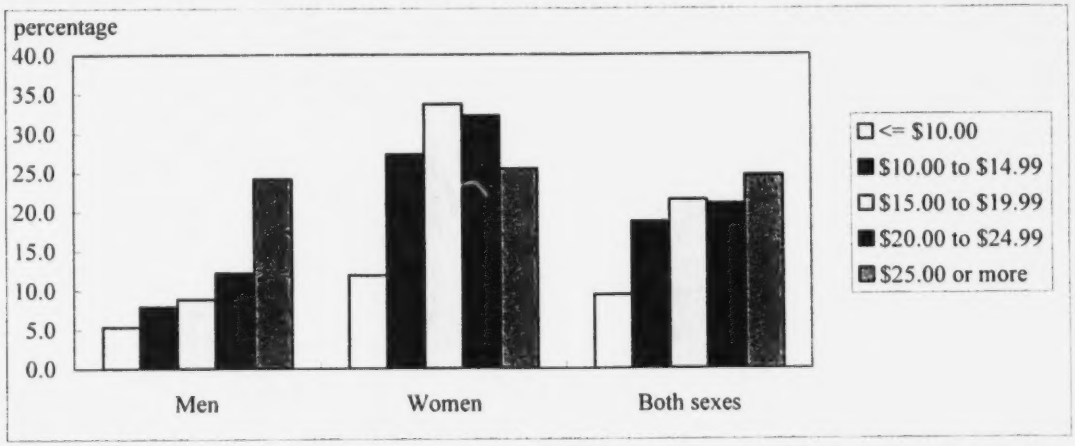
1. Employees aged 15 to 64. Full-time students are excluded.
2. High-skill services include : information and cultural industries, finance and insurance, real estate and rental leasing, professional, scientific and technical services, management of companies and enterprises and administrative and support, waste management and remediation services.
3. Other service-producing industries include: wholesale trade, transportation and warehousing, arts, entertainment and recreation and other services (except public administration).

Source: Statistics Canada, Labour Force Survey (March and September files).

Figure 6 Percentage of employees in jobs potentially affected by service offshoring, by education, 2006[1]

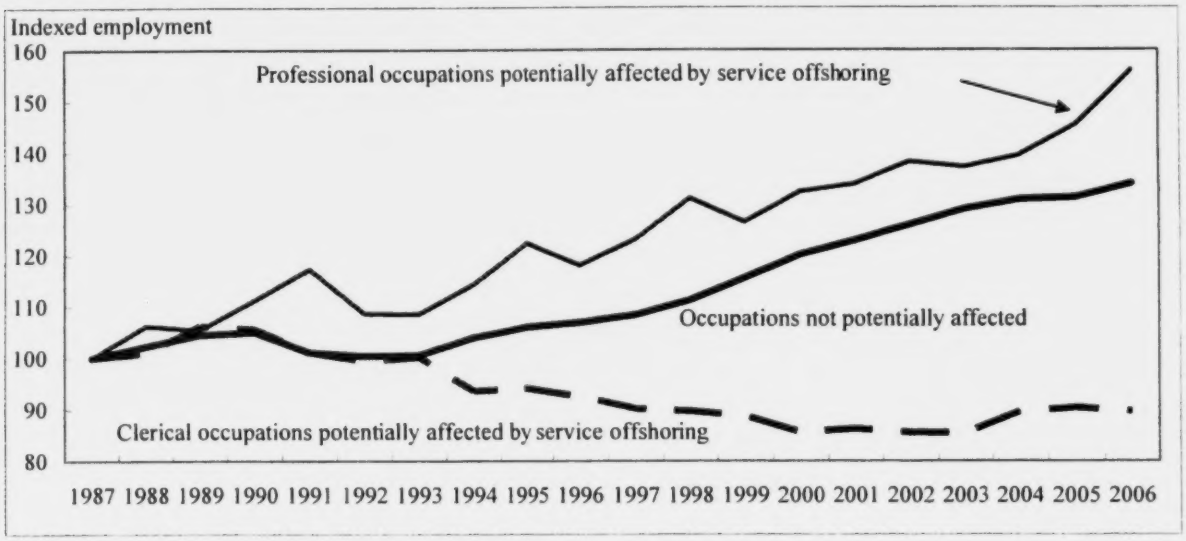
1. Employees aged 15 to 64. Full-time students are excluded.
Source: Statisitcs Canada, Labour Force Survey (March and September files).

Figure 7 Percentage of employees in jobs potentially affected by service offshoring, by hourly wages, 2006[1]



1. Employees aged 15 to 64. Full-time students are excluded.
Source: Statistics Canada, Labour Force Survey (March and September files).

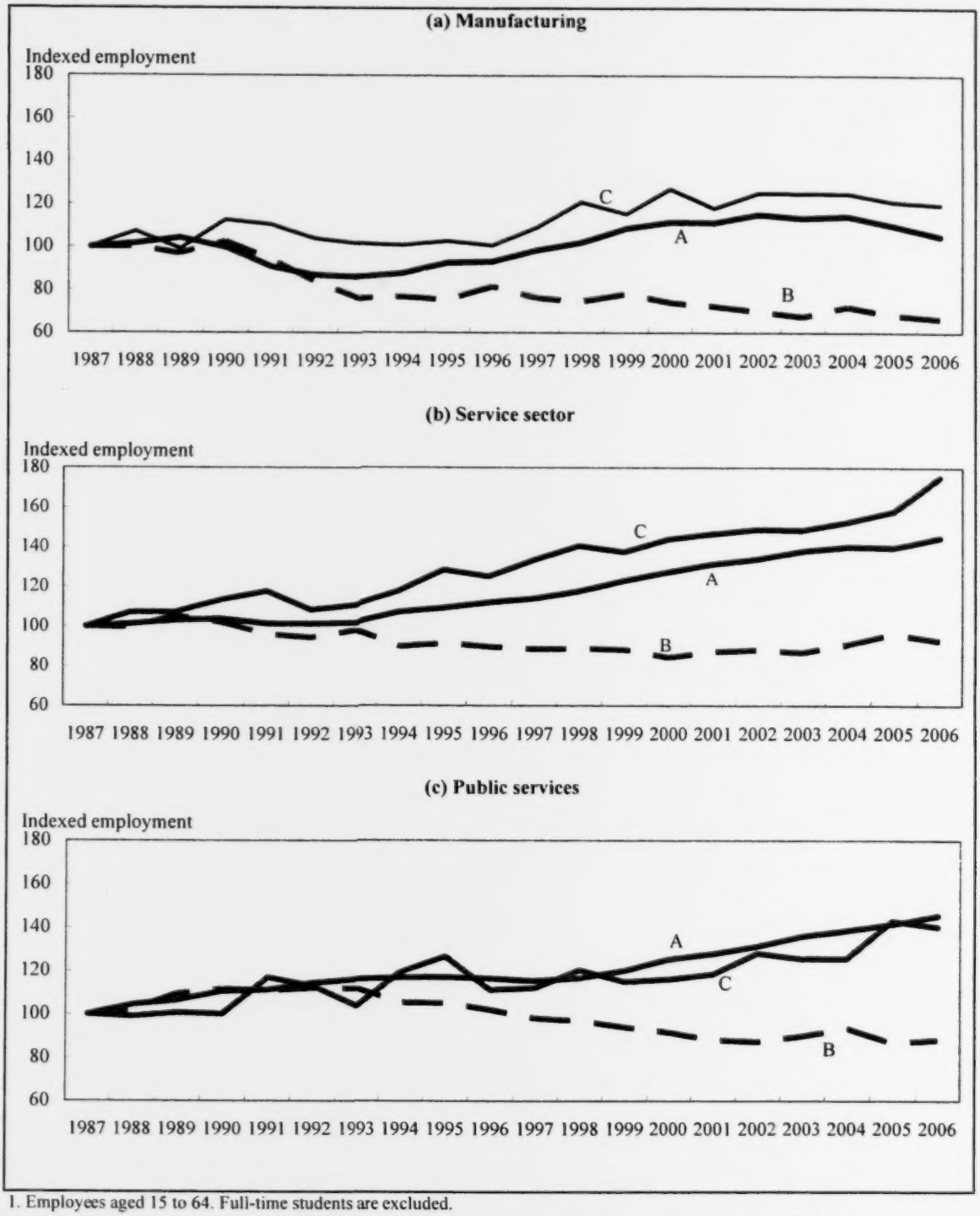
Figure 8 Employment growth in occupations potentially affected by service offshoring, 1987 to 2006 (1987=100)[1]



1. Employees aged 15 to 64. Full-time students are excluded.

Source: Statistics Canada, Labour Force Survey (March and September files).

Figure 9 Employment growth in occupations potentially affected by service offshoring, 1987 to 2006 (1987=100)[1]

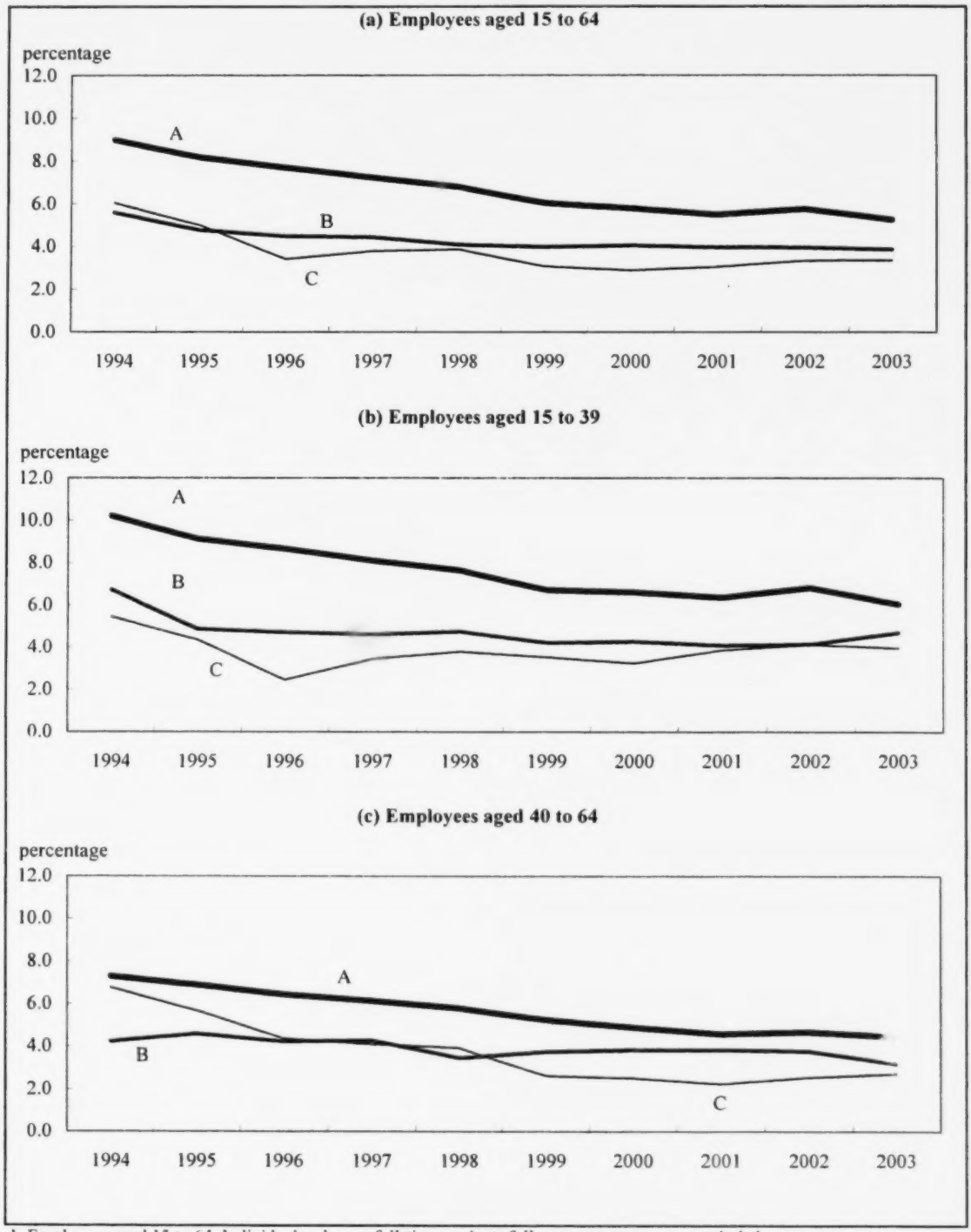


1. Employees aged 15 to 64. Full-time students are excluded.

Note : A = occupations not potentially affected by service offshoring; B= clerical occupations potentially affected by service offshoring; C= professional occupations potentially affected by service offshoring.

Source: Statistics Canada, Labour Force Survey (March and September files).

Figure 10 Layoff rates by occupation, 1994 to 2003[1]

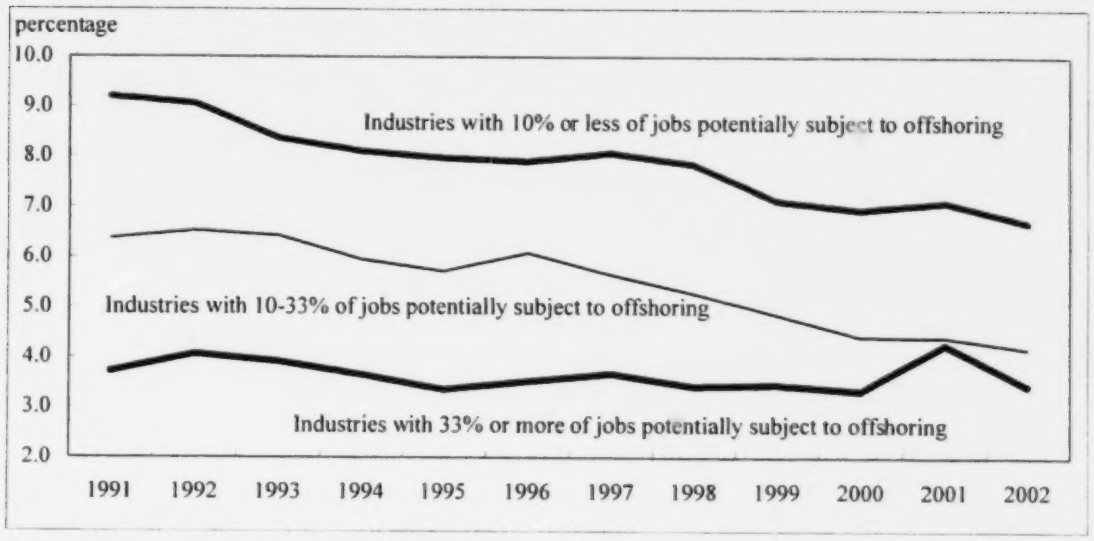


1. Employees aged 15 to 64. Individuals who are full-time students full year or part-year are excluded.

Note: A= occupations not potentially affected by service offshoring; B= clerical occupations potentially affected by service offshoring; C= professional occupations potentially affected by service offshoring.

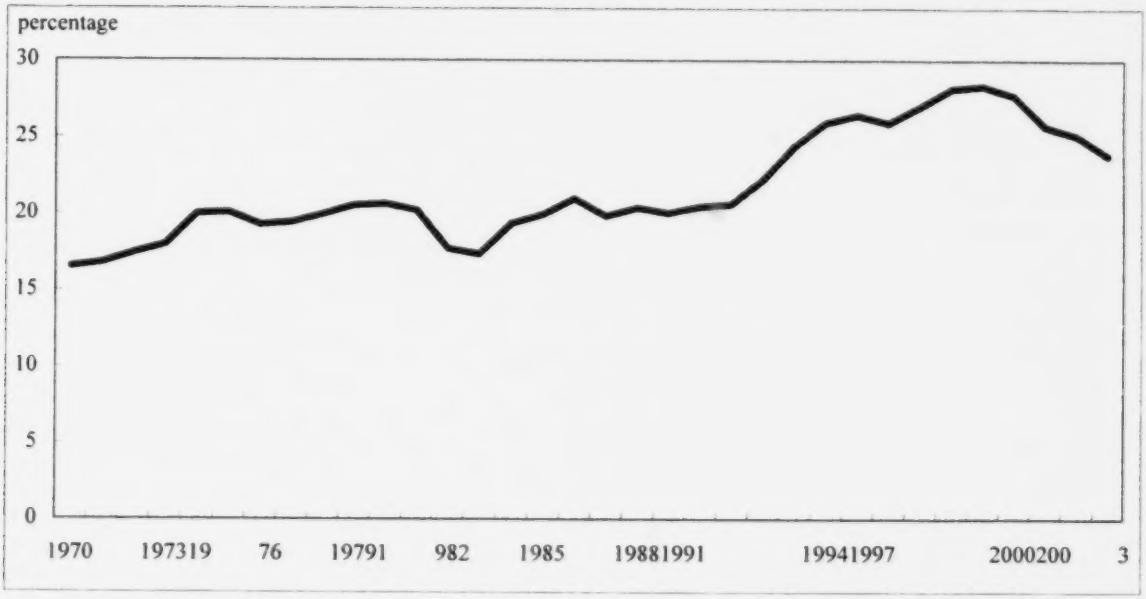
Source: Statistics Canada, Survey of Labour and Income Dynamics.

Figure 11 Permanent layoff rates by industry, 1991 to 2002



Source: Statistics Canada, Longitudinal Worker File.

Figure 12 Share of intermediate goods and services imported by the business sector, 1970 to 2003



Source: Statistics Canada, Input-Output tables.

Appendix 1 Commercial services

1	Communication services :	Post office
2		Telecommunications
3	Construction services :	Construction
4	Insurance services :	Life insurance
5		Non-life insurance
6		Life reinsurance
7		Non-life reinsurance
8		Life insurance commissions
9		Non-life insurance commissions
10	Other financial services:	Commissions on securities trading
11		Financial
12	Computer and information services:	Computer
13		Information
14	Royalties and license fees:	Patents & industrial designs
15		Trademarks
16		Franchises
17		Copyrights
18		Other royalties
19		Computer software royalties
20		Pre-packaged software
21	Commissions:	Non-financial commissions
22	Equipment rentals:	Equipment rentals
23	Management services:	Legal fees
24		Patent & industrial registration fees
25		Trademark registration fees
26		Accounting
27		Management consulting
28		Management
29	Advertising and related services:	Advertising
30	Research and development:	Research & development

Appendix 1 Commercial services (concluded)

31	Architectural, engineering, and other technical services:	Architectural and engineering
32		Scientific and technical
33		Refining fees
34		Mining
35		Environmental
36	Miscellaneous services to business:	Suits & settlements
37		Real estate
38		Tooling
39		Commercial education
40		Miscellaneous
41		Contract production
42	Audio-visual services:	Broadcasting
43		Films
44		Audio-visual services
45		Organized sports
46		Performing arts
47	Personal, cultural and recreational services:	Trade union
48		Other personal services

Appendix 2 Occupations potentially affected by service offshoring

NOC-S[1] / Title of occupation
A121 Engineering Managers
A122 Computer and Information Systems Managers
A123 Architecture and Science Managers
A301 Insurance, Real Estate and Financial Brokerage Managers
A302 Banking, Credit and Other Investment Managers
A303 Other Business Services Managers
A311 Telecommunication Carriers Managers
A312 Postal and Courier Services Managers
A392 Utilities Managers
B011 Financial Auditors and Accountants
B012 Financial and Investment Analysts
B013 Securities Agents, Investment Dealers and Brokers
B014 Other Financial Officers
B022 Professional Occupations in Business Services to Management
B111 Bookkeepers
B112 Loan Officers
B114 Insurance Underwriters
*B211 Secretaries (Except Legal and Medical)
*B212 Legal Secretaries
*B213 Medical Secretaries
*B214 Court Recorders and Medical Transcriptionists
*B311 Administrative Officers
*B312 Executive Assistants
*B412 Supervisors, Finance and Insurance Clerks
*B511 General Office Clerks
*B513 Records Management and Filing Clerks
*B514 Receptionists and Switchboard Operators
*B522 Data Entry Clerks
*B524 Telephone Operators
*B531 Accounting and Related Clerks
*B532 Payroll Clerks
*B533 Customer Service Representatives - Financial Services
*B534 Banking, Insurance and Other Financial Clerks
*B553 Customer Service, Information and Related Clerks
*B554 Survey Interviewers and Statistical Clerks

Appendix 2 Occupations potentially affected by service offshoring (continued)

NOC-S[1] / Title of occupation	
B523	Desktop Publishing Operators and Related Occupations
C181	Computer and Network Operators and Web Technicians
C011	Physicists and Astronomers
C012	Chemists
C013	Geologists, Geochemists and Geophysicists
C014	Meteorologists
C015	Other Professional Occupations in Physical Sciences
C021	Biologists and Related Scientists
C031	Civil Engineers
C032	Mechanical Engineers
C033	Electrical and Electronics Engineers
C034	Chemical Engineers
C041	Industrial and Manufacturing Engineers
C042	Metallurgical and Materials Engineers
C043	Mining Engineers
C044	Geological Engineers
C045	Petroleum Engineers
C046	Aerospace Engineers
C047	Computer Engineers (Except Software Engineers)
C048	Other Professional Engineers, not elsewhere classified
C051	Architects
C052	Landscape Architects
C053	Urban and Land Use Planners
C054	Land Surveyors
C061	Mathematicians, Statisticians and Actuaries
C071	Information Systems Analysts and Consultants
C072	Database Analysts and Data Administrators
C074	Computer Programmers and Interactive Media Developers
C152	Industrial Designers
C172	Air Traffic Control and Related Occupations
E012	Lawyers and Quebec Notaries
E031	Natural and Applied Science Policy Researchers, Consultants and Program Officers
E032	Economists and Economic Policy Researchers and Analysts
E033	Business Development Officers and Marketing Researchers and Consultants

Appendix 2 Occupations potentially affected by service offshoring (concluded)

NOC-S[1] / Title of occupation
F011 Librarians
F013 Archivists
F021 Authors and Writers
F022 Editors
F023 Journalists
F025 Translators, Terminologists and Interpreters
G131 Insurance Agents and Brokers

1. National Occupational Classification.

Notes: In this study, occupations with an asterisk are classified as clerical occupations potentially affected by service offshoring. Other occupations are classified as professional occupations potentially affected by service offshoring.

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